Press Release

eSOL's CTO Becomes Chairperson of IEEE SHIM Working Group

To Contribute to Further International Standardization of Multi-many-core Technology

Tokyo, Japan. February 26, 2019 - eSOL, a leading developer of real-time embedded software solutions, today announced that Masaki Gondo, eSOL's CTO and Technology Headquarters GM, will assume the role of chairperson of the IEEE Computer Society/Design Automation/Software-Hardware Interface for Multi-many-core Working Group (IEEE C/DA/SHIM WG), which was established in February within the Institute of Electrical and Electronics Engineers (IEEE).

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The IEEE C/DA/SHIM WG was established as a new working group for implementing international standardization of multi-many-core technology within the Design Automation Standards Committee of the IEEE Computer Society, which is one of the 39 separate societies within the IEEE. This working group will be in charge of defining descriptive standards of architecture from the standpoint of software design for Software-Hardware Interface for Multi-many core (SHIM) and provide a standard interface to abstract the key hardware properties that are critical to enable multi-many-core tools. This standard interface will assist in reducing costs for supporting new multi-many-core hardware. This is expected to spur development of new and innovative multi-many-core tools for building an ecosystem of multi-many-core technology.

Since 2013, eSOL representatives have been serving as chairperson of the SHIM Working Group for the Multicore Association (MCA) in the United States, which is an international industry group for multi-many-core technology that was established in 2005, and as the vice-chairperson of the Embedded Multicore Consortium in Japan, which was established in 2014. This new IEEE C/DA/SHIM WG is expected to conduct further technical development and prepare specifications based on SHIM Version 2.0, which is the latest version prepared by the MCA. Because of its high level of international recognition, an IEEE standard is being prepared to facilitate worldwide adoption of the SHIM specification.

eSOL is also involved in the R&D Project on OS-Integrated Platform for Scalable Edge HPC by conducting R&D on developing innovative AI edge computing technology for the Project for Innovative AI Chips and Next-Generation Computing Technology Development, which was launched last year by the New Energy and Industrial Technology Development Organization (NEDO). In this way, eSOL is working to resolve technical issues in more sophisticated embedded systems for a wide range of fields and is taking the leadership in conducting R&D for greatly advancing the possibilities of next-generation embedded computing.

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eSOL is a recognized leader in the research and development of embedded real-time OS (RTOS) for multi-many-core processors. In 2012, eSOL was successful in developing the Many-Core real-time OS (MCOS), which was the world's first commercial RTOS for embedded many-core processors, and it has been available in the market since 2013 under the eMCOS® product name. eMCOS is an RTOS that uses a distributed microkernel architecture that is completely different from other conventional single-core and multi-core RTOS architectures, and it incorporates eSOL's proprietary scheduling algorithm "Semi-priority-based Scheduling" (Japanese Patent No. 5734941 and 5945617). Also, eSOL's eT-Kernel™ Multi-Core Edition (MCE), which is an RTOS for multi-core processors that was released in 2006, has a demonstrated track record of successful use in a wide range of highly-advanced embedded systems, including networked home appliances and

car navigation. The eT-Kernel MCE includes eSOL's proprietary Blended Scheduling technology, which enables both SMP and AMP subsystems to coexist within the same system. It also provides a system protection feature that protects the memory and CPU time for easily boosting the efficiency of system integration, real-time capability, and reliability in multi-core system development.

eSOL is striving to leverage its technical capabilities and knowledge base from this development of multi-many-core scalable RTOS and development of a wide range of embedded software solutions with high real-time capability for contributing to the international standardization of multi-many-core technology and expanding the field to even more advanced processors used in intelligent embedded devices such as autonomous driving.

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Masaki Gondo, CTO and Technology Headquarters GM, eSOL

commented that, "As embedded systems grow more intelligent going forward, a wide range of tools will be essential for assisting in the development of software using advanced multi-many-core systems, and SHIM is extremely important as a standard specification for accelerating the process of rapidly bringing these development tools and OSes to the market. The SHIM standard established by IEEE is expected to drive the growth of ecosystems for multi-many-core technology. eSOL will leverage its long history in developing specialized technology and building its knowledge base on OSes and tools for providing leadership for standardization in multi-many-core technology and driving further development of multi-many-core technology."

■**For Reference**

About eMCOS

eSOL's flagship eMCOS is a scalable real-time operating system (RTOS), being the first such product to provide support that extends from single-core to many-core CPUs. The use of a distributed microkernel architecture unlike that of previous RTOSs enables eMCOS to provide scalability both in the number of cores supported, from single-core all the way up to many-core processors with hundreds of cores, and in terms of functionality, from microcontroller systems based on OSEK and AUTOSAR to high-end POSIX and process-model-based systems. The RTOS is also ideal for the heterogenous computing required for IoT applications that involve a combination of different processor types, such as heterogenous and homogenous multi-core and many-core processors, microcontrollers, GPUs, and FPGAs. eMCOS also has a proprietary semi-priority-based scheduling algorithm (Japanese patent numbers 5734941 and 5945617). Along with high performance and scalability, these technologies also ensure the real-time performance that is essential in mission-critical embedded systems.

▽For more information, please visit the eMCOS website at https://www.esol.com/embedded/emcos.html

About eT-Kernel MCE

eT-Kernel Multi-Core Edition (MCE) is an RTOS for embedded systems using a multi-core processor. Featuring eSOL's proprietary Blended Scheduling, the eT-Kernel MCE enables the coexistence of both symmetrical (SMP) and asymmetrical (AMP) multi-core processing in a single system. Four scheduling modes are available based on Single Processor Mode (SPM) and True SMP Mode (TSM). By using a program to select the appropriate mode, it is possible to enjoy the advantages offered by both SMP-type and AMP-type programs within a single system. SMP-type programs offer high throughput, while AMP-type programs feature remarkable real-time capability and software asset re-usability.

▽ For more information, please visit the eT-Kernel website at https://www.esol.com/embedded/et-kernel_multicore-edition.html.

About eSOL Co., Ltd

Founded in 1975, eSOL is a leading company in the embedded systems and IoT sector that seeks to create a rich IoT society using its innovative computer technologies. eSOL's software platform products and professional services, centered around its

real-time operating system technology, are used worldwide in every field, starting with automotive systems, which conform to the most stringent quality standards, and including industrial equipment, satellites, and digital consumer electronics. In addition to the research and development of its own leading-edge products, and joint research with major manufacturers and universities, eSOL is actively engaged in AUTOSAR and Multi/Many-Core technology standardization activities.

▽For more information, please visit https://www.esol.com/.

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